

Current Status of Stem Rot (*Sclerotium rolfsii*) and Late Leaf Spot (*Phaeoisariopsis personata*) in Major Groundnut Growing Districts of Andhra Pradesh

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ABSTRACT

Stem rot incidence was assessed in major groundnut growing districts viz., Ananthapur, Chittoor, Guntur, Vizianagaram and Srikakulam in Andhra Pradesh. Stem rot disease incidence was found to range from 2.1 to 15.3% and severity from 2.1 to 15.1%, with highest mean incidence (12.0%) and severity (11.7%) in Ananthapuram. In Srikakulam, the incidence and severity ranged between 2.8 to 14.1% and 2.8 to 14.5% with a mean of 8.5% and 8.4%, respectively. The lowest mean stem rot incidence of 4.6% was recorded in Chittoor district which ranged from 3.3 to 6.5%, with lowest mean disease severity of 4.4%. Highly uniform to highly aggregated stem rot spatial pattern was observed in the 40 fields surveyed in five districts. Stem rot distribution in groundnut fields of Ananthapuram, Chittoor and Guntur was either uniform or highly uniform while in Srikakulam and Vizianagaram districts, it was mostly aggregated to highly aggregated. Soil pH had no significant correlation with stem rot incidence and severity.

Groundnut (*Arachis hypogaea* L.) is one of the important economic oilseed crops of the world. Groundnut kernel contains more protein (25-36 %) and oil (46-52%) content which is used for cooking purposes. It contains 18% carbohydrates and hence a good source of energy supplying about 5.6 to 5.8 calories per gram of kernel either in raw or roasted forms. It is also very good source of mineral (calcium, Magnesium and iron) and vitamins (B₁, B₂ and Niacin) (Pujar *et al.*, 2011). Groundnut productivity is affected by several abiotic and biotic stresses, which include poor soil fertility, collar rot, stem rot, leaf spots and virus diseases

Stem rot caused by *Sclerotium rolfsii* Sacc. is an important groundnut disease affecting yields. The disease was reported to occur at various intensities causing serious yield losses. In India stem rot incidence was reported from almost all the groundnut growing states. (Siddaramaiah *et al.*, 1979; Ingale and Mayee, 1986; Divya Rani *et al.*, 2016).

MATERIAL AND METHODS

Roving survey was conducted to assess the stem rot incidence in major groundnut growing districts of Andhra Pradesh viz., Ananthapur, Chittoor, Guntur, Srikakulam and Vizianagaram once at 60 days of crop age. Data was recorded in nine quadrats field and two fields in each village, two villages in each mandal, two mandals at each above mentioned districts. The total number of plants present and number of plants showing wilting symptoms due to *S. rolfsii* at each quadrat were counted and recorded. The per cent disease incidence was calculated by using the following formula,

$$\text{Disease Incidence} = \frac{\text{No. of diseased plants}}{\text{Total number of plants}} \times 100$$

Stem rot spatial distribution was determined by using the variance to mean (VM) ratio. VM ratio less than, equal or more than unity were considered to represent uniform, random and aggregated distribution (Campbell and Madden, 1990)

RESULTS AND DISCUSSION

Stem rot disease incidence was found to range from 2.1 to 15.3% and severity from 2.1 to 15.1%, with highest mean incidence (12.0%) and severity (11.7%) in Ananthapuram district. In Srikakulam the incidence and severity ranged between 2.8 to 14.1% and 2.8 to 14.5% with a mean of 8.5% and 8.4%, respectively. The lowest mean stem rot disease incidence of 4.6% was recorded in Chittoor district which is ranged from 3.3 to 6.5%, with lowest mean disease severity of 4.4% (Table 1)

Stem rot incidence and severity varied within the district due to variation between mandals. In Ananthapuram, Chittoor and Guntur districts variation of stem rot incidence between mandals was narrow while in the remaining districts a wide variation between mandals was recorded (Table 2).

Highly uniform to highly aggregated stem rot spatial pattern was observed in the 30 fields surveyed in five districts. Stem rot distribution in groundnut fields of Ananthapuram, Chittoor and Guntur was either aggregated or highly aggregated. In six fields it was either aggregated or highly aggregated and uniform in two fields in each of the three districts. Stem rot distribution was mostly

Table 1: Groundnut stem rot incidence and severity in different districts

District	Incidence		Severity (PDI)	
	Range	Mean	Range	Mean
Ananthapur	7.5 to 13.3	12	7 to 13.1	11.7
Chittoor	3.3 to 6.5	4.6	3.2 to 6.1	4.4
Guntur	5.6 to 10	8.0	5.6 to 10	8.0
Srikakulam	2.1 to 15.3	8.1	2.1 to 15.1	7.9
Vizianagaram	2.8 to 14.1	8.5	2.8 to 14.5	8.4

Table 2: Groundnut stem rot disease incidence severity ranges in different mandals

District	Mandal	Per cent disease incidence	Per cent disease severity
Ananthapur	Obuladevara cheruvu	11.0	10.6
	Nallamada	13.0	12.8
Chittoor	Vadamalapeta	5.0	4.7
	Erpedu	4.2	4.2
Guntur	Karlapalem	8.0	8.0
	Cherukupalli	8.1	8.1
Srikakulam	Singupuram	11.8	11.8
	Rajam	5.1	5.1
Vizianagaram	Bobbili	5.2	5.1
	Sitanagaram	10.9	10.8

aggregated to highly aggregated in six fields and uniform in two fields each in Srikakulam and Vizianagaram districts (Table 3).

Repeated cultivation of groundnut in the same field year after year in Ananthapuram, Chittoor and Guntur has been a practice that might have contributed to survival and uniform distribution of *S. rolfii* inoculum and uniform stem rot incidence in the subsequent season. It was ascertained from the farmers of Srikakulam and Vizianagaram districts that groundnut is cultivated in rotation with either sorghum or maize which might have affected survival and spread that ultimately have led to a more aggregated distribution of inoculum.

The soil pH estimated from the samples collected during survey (ranging from 6.0 to 7.5) had no significant correlation with stem rot incidence ($r = 0.17$) and severity ($r = 0.19$). However, soil type appears to favour stem rot development. Incidence in red soils in Ananthapuram, Srikakulam and Vizianagaram districts was higher than in sandy loams of Chittoor district. Coastal sandy soils also were found to favour stem rot of groundnut as was observed in Guntur district.

Incidence of stem rot was found to be varying in groundnut growing areas of the world. Porter *et al.*

(1984) reported varying incidence of stem rot ranging from 10 to 25 per cent in USA. Incidence of 7.8% was reported in groundnut fields of Karnataka (Siddaramaiah *et al.*, 1979). In Parbhani region of Maharashtra 25% incidence was recorded in JL 24 groundnut variety (Ingale and Mayee, 1986). Gouda (1999) recorded higher stem rot incidence in rainfed (12.57%) than in irrigated (8.68%) groundnut fields during kharif 1998 and rabi 1998-'99 in Dharwad, Belgaum and Haveri districts of Karnataka. Highest stem rot incidence (29%) was observed in Raichur district of Karnataka and lowest disease incidence was observed in Chittoor district of Andhra Pradesh (Pande and Rao, 2000). Prasad (2008) found an incidence of 10.38% in Chittoor and 17.84% in Kadapa districts of Andhra Pradesh. Rakholiya (2009) recorded incidence ranging from 2 to 40% in Saurashtra. Divya Rani *et al.*, (2016) reported that Chittoor district (10.06%) followed by Anantapur (8.75%) were the major groundnut growing districts with the highest incidence. In the present study also varying stem rot incidence was recorded at 2.1 to 15.3% in the five districts surveyed. Spatial distribution of stem rot was found to clustered in North Carolina peanut fields (Shew *et al.*, 1984; Punja *et al.*, 1985).

Table 3: Mean and Variance of stem rot distribution in groundnut fields of five districts of Andhra Pradesh

Field No	Disease incidence			Distribution Pattern
	Mean (M)	Variance (V)	V/M	
Ananthapur				
1	12.06	9.71	0.81	Uniform
2	7.52	8.71	1.16	Aggregated
3	12.01	17.9	1.49	Aggregated
4	12.45	10.76	0.86	Uniform
5	13.25	7.34	0.55	Uniform
6	13.27	2.86	0.22	Highly Uniform
7	13	2.9	0.22	Highly Uniform
8	12.29	11.17	0.91	Uniform
Chittoor				
1	6.53	3.93	0.6	Uniform
2	4.09	2.09	0.51	Uniform
3	4.23	4.63	1.09	Aggregated
4	5.01	2.53	0.5	Uniform
5	4.05	1.39	0.34	Uniform
6	3.28	1.88	0.57	Uniform
7	4	2.63	0.66	Uniform
8	5.61	6.09	1.09	Aggregated
Guntur				
1	9.43	5.7	0.6	Uniform
2	10	4.07	0.41	Uniform
3	6.77	2.95	0.44	Uniform
4	5.57	0.99	0.18	Highly Uniform
5	8.5	7.02	0.83	Uniform
6	9.79	24.06	2.46	Highly Aggregated
7	6.88	13.65	1.98	Aggregated
8	7.3	6.15	0.84	Uniform
Srikakulam				
1	13.27	19.41	1.46	Aggregated
2	12.67	8.53	0.67	Uniform
3	7.03	21.31	3.03	Highly Aggregated
4	14.14	14.06	0.99	Uniform to random
5	7.31	6.28	0.86	Uniform
6	6.88	13.65	1.98	Aggregated
7	3.46	15.41	4.45	Highly Aggregated
8	2.79	11.72	4.2	Highly Aggregated
Vizianagaram				
1	5.13	7	1.36	Uniform
2	7.6	11.24	1.48	Uniform
3	2.15	5.2	2.42	Highly Aggregated
4	6.05	9.03	1.49	Aggregated
5	15.33	27.01	1.76	Aggregated
6	11.52	22.21	1.93	Aggregated
7	7.51	19.89	2.65	Highly Aggregated
8	9.42	13.31	1.41	Aggregated

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